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ABSTRACT

Aspects are summarized of a current approach to social indicator research and related problems in policy analysis generated by an interest in isolating major sources of variability in the generation of human welfare and developing indicators associated with welfare-generating processes. A set of models being developed for indicator research is described and some of their implications explored. Suggestions are made for assessing performance from both an institutional perspective and a social perspective. The first section considers sources of variability in welfare generation that can be traced to the processes of transforming resources into welfare outcomes through production or consumption activities. Section 2 discusses extending the models to include sources of variability arising from the institutional settings in which these activities occur. The third section illustrates implications of these models for identifying the information requirements of the client and service providers of a prototypical public school system. (Author/MLF)

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AN URBAN INSTITUTE PAPER

MODELS FOR INDICATOR DEVELOPMENT
A Framework for Policy Analysis

Harvey A. Garn
Michael J. Flax
Michael Springer
Jeremy B. Taylor

1206-17

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ABSTRACT

Problems of assessing performance and accountability are central to social indicator research and policy analysis generally. Many of these problems relate to the techniques and models employed to formulate and evaluate public action, particularly their capacity to account for how the activities of ordinary citizens and the design of bureaucratic and political institutions contribute to levels of welfare or illfare.

Responding to these problems in the course of their research on social and urban indicators, the authors have developed a general framework for policy analysis which combines many of the substantial concerns and key concepts of political science, microeconomics, and management science. This paper describes a set of models that can simultaneously treat the critical input/output relationships and institutional characteristics that affect policy and program outcomes. These models are designed to help:

(1) account for contributions of clients or consumers as well as producing units (public and private) to levels of public performance,

(2) identify those sets of information, indicators of performance, and kinds of analysis that tend to be useful to politicians, high level administrators, program managers, or operational personnel, and

(3) distinguish between issues of institutional performance (those related to managerial accountability) and of social performance (those related to accountability to citizens).

ACKNOWLEDGEMENTS

This paper is the result of the most difficult kind of team research--the development of a multidisciplinary theoretical framework. While we began with a set of common problems and questions, these models draw upon the diverse contributions and perspectives of the authors, and their synthesis entailed a long and intense mutual learning experience. Numerous constructive and useful comments were provided by friends and colleagues. We are especially indebted to Karl Fox, Martin McGuire, Mancur Olson, David Porter, and Nestor Terleckyj. The preparation of numerous drafts and redrafts was efficiently and cheerfully undertaken by our secretaries, Rhonda Truet and Jacqueline Swingle. Since we are attempting to mark off new intellectual ground, we would very much appreciate comments and criticisms from our readers.

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INTRODUCTION

The purpose of this paper is to summarize aspects of our current approach to social indicator research and related problems in policy analysis. A set of models we are developing for indicator research are described and some of their implications explored. In this work, we share an enduring (if frequently implicit) concern of indicator researchers in identifying measures and relationships which have something significant to say about the generation of human welfare.

Our fundamental interest is in isolating major sources of variability in the generation of human welfare and developing indicators associated with welfare-generating processes. Pursuing this interest has led us to suggestions for assessing performance from both an institutional perspective and a social perspective. In this paper we first consider sources of variability in welfare generation which can be traced to the processes of transforming resources into welfare outcomes through production or consumption activities. This discussion is in Section I. Second, we extend the models to include sources of variability arising from the institutional settings in which these activities occur. This discussion is in Section II. The third Section illustrates implications of these models for identifying the information requirements of the client and service providers of a prototypical public school system.

In the social indicator movement there is a divergence between those researchers who view their role primarily in terms of a basic research effort (that is, research which takes its problems from the matters of most concern to those knowledgeable in particular academic disciplines) and another group of applied researchers (that is, those who take their problems from observed activities and the difficulties which people have in achieving welfare outcomes). The former group takes the view that the development of an improved knowledge base will necessarily have policy implications. The latter group takes the view that the welfare implications of public policy and their implementation should provide the focus of the needed research and shape the research agenda.

Our research is of this latter kind. Therefore, the problems and concerns of decision makers and citizens, both when they coincide and when they diverge, provide the focus of our work.

Among the people most directly affected by social policies and programs it is increasingly common to find concern with outcomes that are tangibly related to their own welfare. That is, both in legislation and in the street, the goals of these people are to reduce the fear of crime, to increase the ability to read, and to decrease the number of disability days, rather than to have more police on the streets, bigger and newer schools, and more elaborate medical equipment. This is not to deny that one can imagine plausible relationships between a child's education, for example, and the number of teachers and the adequacy of school buildings. Rather, people are becoming aware that how such variables affect learning, and what learning adds to welfare, are much more intricate and involved processes than the mere provision of service delivery possibilities.

Not only have people become aware of the complexity of relationships which determine the degree to which resource use does or does not result in improved welfare, they are also increasingly aware of the significant roles played by a wide variety of institutional structures and networks in this process. Since, in practice, many of the welfare-related outcomes in our society are processed through and, to a considerable degree, are dependent upon the behaviors of actors in formal institutions, these structures shape information requirements both for institutional actors and for those assessing performance. The structural characteristics of institutions have an important and nonrandom relationship to the kinds of uncertainties which decision makers at different levels must face. It is possible, within this context, to identify the types of information which decision makers at various institutional levels would find useful for coping with the uncertainties they face.

Unfortunately, those researchers who have been concerned primarily with outcomes have tended to focus their attention almost exclusively on the kinds of considerations represented by our first set of models, that is, models which describe the move from inputs to welfare outcomes. They have often failed to account for the fact that the institutional structures through

which these activities occur are highly relevant to both the level and nature of these outcomes. On the other hand, those who focus their attention on the internal interactions and activities of actors in their institutional roles have paid relatively little attention to outcomes. Relating models dealing with input/output or benefit relationships to models dealing with institutional roles and behaviors is productive for (1) more clearly identifying the major sources of uncertainty which actors in different roles must face, (2) more sharply defining the information requirements for these actors, (3) coming to grips with the problems of accountability for performance within institutional structures relative to institutional goals, and (4) providing a framework for assessing performance from the perspectives of those affected by the activities of complex organizations as well as from the perspectives of those responsible for controlling these institutions.

This paper provides descriptions of such models and information about their relevance to these issues. We are aware that other analysts are addressing these and similar issues from a variety of perspectives and therefore make no claim that our approach is exhaustive or exclusively valid. The purpose of this report is not to provide solutions to these highly complex issues, but to present, discuss, and illustrate the conceptual underpinnings of these models which we believe begin to address them. The intent is to facilitate conceptualization of problems, specify critical relationships, and identify important questions for further inquiry by analysts and policy makers alike.

I

MODELS OF THE GENERATION OF WELFARE
Resource Use, Production, and Consumption Processes

One of the problems central to indicator research is to isolate relationships between the activities of institutions which produce goods and services, or make decisions affecting their production, and the quality of life people experience as individuals or as members of households or communities. This can be viewed as a problem of establishing relationships between inputs, policies and programs, and the resultant social outcomes. Cast in this manner, it is fairly obvious that isolating such variables and their relationships is not only central to indicator research but also to benefit/cost analysis, evaluation research, and policy analysis generally.

In conceptual terms, the problem has usually been addressed solely as a production problem. Often, the same analytic models that have been employed successfully to monitor and control the production of goods within firms have been extended with little change to the analysis of public sector activities. Unfortunately, major difficulties have plagued such analysis. Different assessments of the same programs have produced highly divergent estimates of programmatic benefits or outputs relative to costs. Assignment of responsibility for variations in benefit/cost ratios has tended to be a highly uncertain enterprise, particularly with regard to the benefits derived from the delivery of services. Efforts to overcome these difficulties by developing more elaborate definitions of outputs and increasingly sophisticated models of production processes have not led to significantly improved results.

We have concluded that this situation is unlikely to be remedied without significant changes in the analytic models being employed. In the discussion below, we call attention to some of the modifications which seem to be required. They are:

(1) the inclusion of nonmarket (normative) resources as inputs in production processes;

(2) the abandonment, for many uses, of the convention of assuming either that observed systems are in equilibrium, or that

observed differences in opportunities and constraints are in the process of elimination as the system approaches equilibrium;

(3) the recognition that externalities or latent effects are unlikely to be eliminated or compensated for by the action of government;

(4) more detailed treatment of the client's role in producing service outcomes; and

(5) more extensive analysis of client or consumer roles in converting assets into welfare outcomes.

Researchers in a variety of disciplines and specialties within disciplines have raised some of these issues. Although we know of no place where they are put together in the way we suggest, we have tried to utilize this research where relevant.

Since we are concerned, in this section, with relationships between inputs and welfare outcomes, economic paradigms provide a useful starting place. As Marc Nerlove puts it,

> In its most unadorned form, economics is the theory of allocation of limited resources among competing ends in order to maximize satisfactions (or utility), subject to the constraints imposed by limitations in the availability of the resources required to achieve those ends. Various elaborations and accretions are necessary to accommodate this central theoretical core to the dynamics of choices made sequentially over time and in the presence of uncertainty regarding future constraints and future preferences.[1]

The core model of economics, referred to by Nerlove, recognizes three major potential sources of variability in welfare outcomes:

(1) production activities and resource use;

(2) consumer preferences and command over goods and services; and

(3) the price structure for resources, goods, and services.[2]

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1. Marc Nerlove, "Household and Economy: Toward a New Theory of Population and Economic Growth," Journal of Political Economy, Volume 82, Number 2, Part II, March/April 1974, p. S202. In this Section, we discuss some aspects of the dynamics of choice and uncertainty. Considerable attention is given to aspects of uncertainty in Section II.

2. As explained below, we would add consumer technology and nonpriced resources, goods, and services to this list. "Technology" here refers to the

In the most rigorous form of the core model, the price structure for resources is assumed to reflect their relative scarcity and productivity, competition among producers is assumed to eliminate waste of resources, prices for goods and services are assumed to reflect both output costs and the relative demand for different outputs, and consumers are assumed to maximize their satisfactions or preferences within the constraint of their incomes. The linchpin in the system is the set of prices.

In our work, we do not start with these assumptions. This is not due solely to the observation that they are frequently unrealistic empirically. The customary use of such assumptions is to derive analytic solutions which have the appearance of greater precision than is justified, given the wide range of probable influences on welfare outcomes. In our models we will call attention to both production and consumption processes. However, since we feel that it is important to consider aspects of these processes and their relationships considerably beyond marketed resources, goods, and services, the strict equilibrium and pricing assumptions of the core economic model become a special case rather than the reference point from which other analysis flows. Furthermore, as indicated above, we find it informative to maintain a sharper distinction between goods and services than is customary.

In the following discussion, production of goods (tangible assets), production of services (tangible and intangible assets), and utilization of assets in welfare generation will be treated sequentially.[1] This presentation approach accords with customary practice, but may give a misleading impression in this case. It is not true that one section of the society (e.g., firms) is solely engaged in production activities while another section (e.g., individuals and households in their domestic activities) is solely engaged in consumption. Whether a particular process (wherever it occurs) is best treated as a production or consumption process cannot be determined solely by observing who is acting and under what auspices. It is an important

---

ways in which resources are used to generate outputs. Resources such as knowledge or capital equipment are viewed as constraints on the technologies adopted by individuals, households, or firms.

1. Tangible assets refer to resources imbedded in things and institutions, such as money and machinery, while intangible assets define resources, such as knowledge and health, which are imbedded in people.

aspect of the modern theory of household production[1] that households (or individuals) can be conceived as undertaking production activities analogous to those in firms. At the same time, the consumption theory in Boulding's Reconstruction of Economics[2] can be applied to firms as well as individuals and households. As a rough guide, it is often most useful to consider a process to be a production process when the primary interest is the stock of assets which result from the process and as a consumption process when the interest is primarily in the management and use of an initial stock of assets. Viewed as production processes, the activities of society are constantly transforming the stock of assets available for later use. Viewed as consumption processes, individuals and organizations face an available stock and determine whether or when to use it, transfer it, or transform it.

Becker's "Theory of the Allocation of Time" explicitly treats the active role of the user of so-called "final" goods and services in producing levels of welfare and satisfaction. It is consistent with his usage to speak of organizations actively attempting to produce levels of organizational welfare, although he does not tend to do so. Boulding's theory of consumption is generalizable, also. Speaking of appropriate questions one would like to answer with a theory of consumption, he says:

> The first question is, Why does an individual consume the amount of various kinds of assets that he does? The second is, How much of the consumed aset does he want to replace? The third is, How does he want to replace it: by production or by exchange, and if by exchange, what other assets does he wish to give for it. The fourth question is, What other assets does he wish to acquire, either by production or by exchange? In order to answer these questions we need to know not merely what determines the individual's pattern of consumption, but also what determines his asset structure. If we are given a consumption pattern and an asset structure we can then picture the dynamic process of the individual's economic parameters through time . . . . It is clear that we have here a complex system of interrelated variables. It would not be difficult to postulate an equilibrium of such a system in terms of utility or preference-function analysis, based on the propositions that in any day the individual produces of various assets that amount which he thinks is worth producing, consumes of each asset that amount

1. See Gary Becker, "A Theory of the Allocation of Time," Economic Journal, Volume 75 (September 1965), and Richard F. Muth, "Household Production and Consumer Demand Functions," Econometrica, 34 (July 1966).

2. Kenneth E. Boulding, A Reconstruction of Economics (New York: Science Editions, Inc., 1952).

> which he thinks is worth consuming, and exchanges those amounts which he thinks are worth exchanging. A mere formal system of equations, however, does not tell us a great deal: it is the character of the functions that matters. This character is complex and may vary considerably from individual to individual. The patterns of the consumer are in fact the patterns of living and require complex psychological and sociological study. It may well be that variables which fall under the general field of sociology--e.g., Veblen's conspicuous consumption, emulation of the neighbors, conventional patterns associated with certain occupations or certain "positions" in society--play a more important role in determining the consumer's economic behavior than any strictly "economic" considerations.[1]

Although this argument is cast in terms of individual choices, it can be seen to apply equally well to the consumption choices of organizations (i.e., management and use of assets).

Understanding the generation of welfare in society, then, involves the utilization of both production and consumption models. It makes sense to conceive of welfare levels for both individuals and organizations. It, also, makes sense to conceive of individuals being simultaneously engaged in both consumption and production processes. Which aspect deserves the most attention depends upon the problem under study. Often, however, effective policy analysis will require both.

Consider, for example, policy analysis related to housing and education, or job satisfaction and productivity. Similar observations would apply in other areas of policy choice. Some aspects of housing policy are concerned with the production of housing units as tangible goods. Other aspects of housing policy must be concerned with the stock of potential welfare-generating service characteristics of the housing unit and the characteristics of its environment which comprise the asset structure from the point of view of consumers. Policy analysis in education can be related both to the production of educational outcomes and to the management and use of these educational outcomes in conjunction with other assets by the person educated. It should be clear, also, that since the person being educated is part of the production process in which the education occurs, his roles as a consumer and as a producer can influence each other. This kind of interaction is also at the heart of policy issues associated with worker productivity and job satisfaction. It is not clear that work can be arranged to increase the worker's contribution

1. Kenneth E. Boulding, op. cit., pp. 146-7.

to production at the same time as his own consumer's sense of welfare-producing characteristics associated with the work situation is increased.

The determination of indicator sets relevant to policy choice requires attention to such multiple roles and interactions as well as a sense of whether the problem at hand is best conceived as a production problem or a consumption problem. For illustrative purposes, we will now further develop models of the production of goods (tangible assets), the production of services (tangible and intangible assets), and the utilization of assets in generating individual (or household) welfare. In our discussion, we often adopt the convention of treating as consumer roles the production activities of individuals and households using "final goods" in the generation of welfare. The reader is asked to bear in mind that these same individuals are constantly "consuming," in the sense that they are using up assets--if only time--and obtaining satisfaction (dissatisfaction), in all activities. In some cases, such as the analysis of job satisfaction, these intrinsic consumption activities are highly important, even though the ostensible purpose of the activity of the individual is production.

The Production of Goods (Tangible Assets)

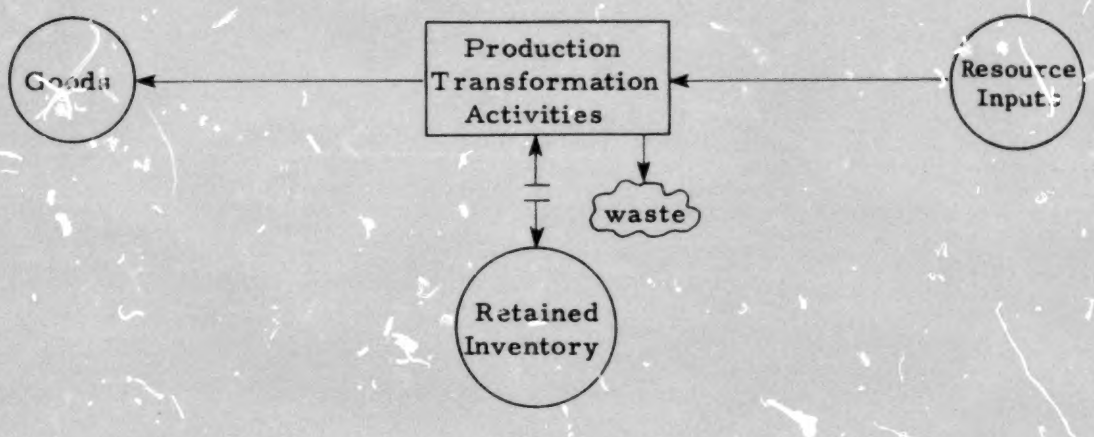
Our modelling of the production of goods (tangible assets) is straightforward and relatively conventional; i.e., a mix of resources is modified through a set of activities or processes in order to produce an array of goods, during which waste may occur (see Figure 1). To develop indicators for a particular transformation process, one must specify a mix of goods or products, and the activities and resources associated with their production.

The resources which we assume enter into the production process fall into broad categories--utilitarian and normative.[1] Utilitarian resources are inputs that can, at least in theory, be exchanged in an economic market, e.g., money, manpower, technology, organizational capacity, land, and capital equipment. Indicators of utilitarian resources tend to have associated market prices and information about them is generated from the record-keeping

1. It is customary in economics to ignore the role of "normative resources" as we have defined them, except as they get translated into "human capital."

Figure 1

The Production of Goods*



*In all figures of our model, boxes are used to indicate activities or processes, while circles portray the inputs to, or results of, these activities or processes. Waste is conventionally shown by an irregular enclosure. Parallel lines ⫫ signify a time delay.

activities of organizations. Normative resources are symbolic assets that can be used to encourage efforts or penalize those who deviate from desired patterns of behavior, such as values, norms, folkways, and sentiments. Resources of this sort result from the complex processes of social exchange and obviously are not openly accounted for by bureaucracies, and are seldom integrated into production models.[1]

Waste is a measure of the degree of efficiency of the production process. That is, if there is waste, it is assumed that more goods could be produced

1. For a contemporary theoretical discussion of how social phenomena can be viewed in terms of exchange processes, see Peter M. Blau, Exchange and Power in Social Life (New York: John Wiley, 1964). Such approaches have roots in the classic tradition of social thought. For example, see Georg Simmel, The Sociology of Georg Simmel (Glencoe, Illinois: The Free Press, 1950). Indicators of resources developed by us are focused primarily upon assets of utilitarian character. The range of resources identified as entering any analytical system of relationships, in effect, defines the limits of what kinds of phenomena and problems a model can address. For contrasting typologies of resources, see Amitai Etzioni, The Active Society (New York: Free Press, 1968), especially pp. 357-59 and Peter B. Clark and James Q. Wilson, "Incentive Systems, Administrative Science Quarterly, 6 (1961), pp. 129-66.

without the application of additional resources of either a utilitarian or normative character.[1] The retained inventory category accounts for additions to or subtractions from assets that result from current production activities. These assets could be utilitarian such as stocks of finished or partially assembled goods, skills of production workers, or more efficient systems of organizing production. They can also be normative such as improved worker morale. The time delay symbol indicates that observations of increases or decreases in retained inventory is sometimes delayed in time.

Any particular organizational unit producing goods is subject to a variety of opportunities to act and constraints on its actions, the creation of which is outside the direct control of the producing unit. The producing unit, itself, may generate positive or negative effects (externalities) by actions that affect other producing units or individuals which have no control over the initial producing unit. Differential opportunities and constraints as well as external effects can persist over both time and space and need to be taken seriously.

It is important to note that customary production models make a different set of assumptions than those just discussed concerning the nature of the opportunity and constraint structures facing production units. Such units, for example, are assumed to have detailed information about variables that are relevant to their production choices and activities. An extreme version of this assumption is that the relevant information is entirely subsumed in the system of prices. Hayek says:

> There is hardly anything that happens anywhere in the world that might not have an effect on the decision he ought to make. But he need not know of these events as such, nor of all their effects. It does not matter for him why at the particular moment more screws of one size than of another are wanted, why paper bags are more readily available than canvas bags, or why skilled labor, or particular machine tools, have for the moment become more difficult to obtain. All that is significant for him is how much more or less difficult to procure they have become compared with other things with which he is also concerned, or how much more or less urgently wanted are the alternative things he produces or uses.[2]

1. A reduction of waste would represent a movement toward Pareto optimality in standard economic terms. Analogous notions can be applied to the efficiency of social relationships; see Blau, op. cit., Chapter 7.

2. Friedrich A. Hayek, "The Use of Knowledge in Society," Individualism and Economic Order (Chicago, Illinois: University of Chicago Press, 1972), p. 85.

Insofar as the price system works this way, and people have knowledge of the prices, variation in relationships between the (priced) inputs and the (priced) outputs represents differences in production efficiency.[1] Such a conclusion cannot be reached when differential opportunities and constraints persist over both time and space (location). Prior to attempting to assess the efficiency of specific sets of producer activities, effects of differential opportunities and constraints on resource use, location, and choice of technology must be explored.

Before leaving the discussion of goods production, we should note an important difference between goods outputs and many service outputs. Not only are goods frequently more tangible outputs than are services, but there is no reason that the transaction between the producer and a consumer will directly affect the level of output. The asset positions of the seller and buyer change in a sales transaction but the output is not affected by the attitudes or behaviors of the seller or buyer. As we will see later, this is not the case with service production. This enables an analyst, without serious distortion, to treat goods producing units as self-contained entities for purposes of assessing whether or not the units are efficient. Comparisons of production efficiency can also be made across production units, once differential effects of opportunities and constraints are estimated, without reference to the consumers of the product. Again, this is not true with service production.

The Production of Services

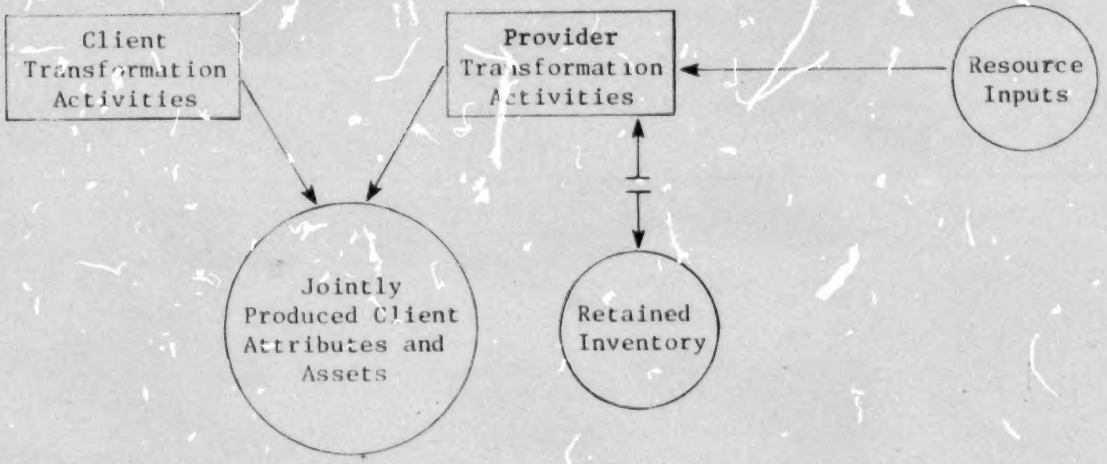
The process of producing service outputs has fundamentally different aspects from the production of goods. These differences prevent straightforward transfer of analytic models used to examine goods production to problems of service production. Some analysts have treated the distinction between goods and services as analytically unimportant or have assumed that the distinction resides solely in the nature and definition of outputs. For example, it has often been noted that service outputs are frequently less tangible than goods outputs and, consequently, harder to measure. A great deal of effort has been devoted, therefore, to developing appropriate measures.

1. The equilibrium solution implies, also, the choice by all like producers of the most efficient technology.

There is no reason to disparage or to discourage such efforts. We have noted, however, that it is often assumed that once appropriate measures are created, the analysis of service production processes can proceed essentially in the same manner as, say, automobile production. It is this step which is open to question. Some elaboration of a service production model is needed to explain why this is so (see Figure 2).

Figure 2

The Production of Service Outputs



We should start by noticing that service outputs invariably show up as some change in the intangible assets of the client or the consumer. We have no difficulty in saying what the level of car or housing production was over a given time period even if none of the produced cars or homes have found their way to consumers. On the other hand, it is impossible to say that health services have been provided by a doctor's office with no patients, or education services by a school with no students, or banking services by a bank with no customers. What this means is that the person being served (the client or consumer) is inevitably part of the production process, if there is to be <u>any</u> production whatsoever. Therefore, the resources,

motivations, and skills brought to bear by the client or consumer are much more intimately connected with the level of achieved output than in the case of goods production.[1] The output is always a jointly produced output.

A further implication of this is that the provider of services, such as health and education services, does not normally have as much control over the production process as is true in goods production. Following identical, routinized patterns of service delivery, from the point of view of the provider of services, can result in quite different outputs for different clients. In short, the degree of efficiency of the production process cannot be attributable solely to the activities of the service provider. The analysis of efficiency must include an awareness of the client's activities and their efficacy.

It should be noticed, also, that the sorts of actions which may tend to promote efficiency in goods production, with reasonably well known technologies, may not have the same effects in service production. Technologies, which are sophisticated enough to correctly isolate the effects of particular client attitudes and roles, are not well known by service providers. Attempts to routinize functions may be counter-productive, therefore, as the service provider transmits signals reflecting unawareness of the particular aspects of the client's motivations or interests which result in lower levels of output. Such signals are, of course, two-way communications--clients may participate in such ways that the provider of the services reacts in counter-productive ways. That is, the way in which service interaction occurs directly affects satisfaction levels as well as behaviors influencing output levels.

While some of these observations are widely accepted, few analytic models of service production make any attempt to take them into account. In such a situation, it is not overly surprising that large variations exist in estimated output/cost ratios in service programs even when "treatments" are held constant. It is not enough to imagine that client roles are held constant by using gross variables such as age, sex, or race classifications. It may turn out that there is not enough regularity in these interactions

1. This does not imply that a producer of goods for sale can be expected to ignore completely consumer interests. It does imply that such a producer can largely ignore individual variations in consumer preferences in determining how best to organize his production.

to determine the exact causes of observed variation; but attempts to identify the sources of variation in both the activities of providers and clients at least have the virtue of addressing some of the major problems as viewed from both sides.

We have indicated above that service outputs inevitably show up as a change in the asset structure of clients or consumers. Observing the nature of these changes is a useful means of distinguishing among varieties of service production. We have distinguished two major types of service, those in which the output appears as:

(1) a change in the tangible asset structure of both the client and the provider, and

(2) a change in the personal characteristics or attributes of the client.

There is a third group (primarily brokerage activities) in which the output--if there is any--shows up as changes in tangible or personal assets of clients who are providers and clients who are consumers of the service. Examples of the first kind of service are economic development lending activities, maintenance services associated with durable goods, and retail services. Examples of the second kind of service are training and education services, health care services, and counselling. Examples of the third kind of service are referral programs and real estate brokerage. Virtually all service activities or programs fit into one of these categories.[1]

These categories are analytically interesting because they represent different degrees of ability by the provider of the service to control the level of output achieved through control of his (or his institution's) activities. It becomes progressively more difficult to ascribe responsibility for variations in outputs as one moves from assessments of the first kind of service to the third. Unfortunately, evaluations which fail to notice the differences between goods and services and among service types are certain to provide truncated and, possibly, misleading clues about how or if to change the types

1. Needless to say, the comments made in the section on goods production about differential opportunities and constraints as well as possible externalities apply with even more force to service production since they relate to choices by both the ostensible provider of the service and the client or consumer.

of services or service activities in order to change the level of service output.[1]

The Utilization of Assets in the Generation of Welfare

Up to this point in the discussion, we have been concerned with questions of the production of output or assets. It is now time to discuss the uses of goods and service outputs in achieving outcomes related to the welfare of individuals and households.[2] For purposes of this section, one should assume that the individual has (at some point in time) a stock of tangible assets and of personal attributes or characteristics. We are interested in how these stocks are utilized to generate welfare outcomes.

These processes have tended to receive very little attention in economic analysis until recently. In practice, economic models tend to treat welfare generation as the act of acquiring assets, rather than the activities involved in utilizing assets in the generation of outcomes desired by the consumer. William Alonso is accurate when he observes that:

> Economics has concentrated on the processes of production and virtually ignored those of consumption. It has treated the act of consumption as magic: final goods and services disappear as they arrive to the consumer, without even a wave of the cape. To be sure, certain areas of spatial economics deal with the consumer, most notably rent and central place theories, some studies in transportation, and certain recent developments in welfare economics which take into account travel or queing time. But even here the consumer is treated in a most abstract fashion, disembodied into a demand curve or a utility function. Yet the consumption activity is the principal concern of the most widespread of economic units, the household. It is an activity that itself consumes resources, and it is internally structured in terms of a technology and the availability and relative costs of factors.[3]

1. For a further discussion of these issues, see Harvey A. Garn, "Public Services on the Assembly Line," Evaluation, Volume 1, Number 2, 1973, Urban Institute Reprint 156-1206-15, and his "Program Evaluation and Policy Analysis of Community Development Corporations," appearing in The Social Economy of Cities, Volume 9, Urban Affairs Annual Reviews, Sage Publications, Inc., June 1975, Urban Institute Reprint 183-0719-01-6.

2. As indicated in the introduction, an analogous discussion would apply to the utilization of assets in generating organizational welfare.

3. William Alonso, "The Economics of Consumption, Daily Life, and Urban Form," Department of City and Regional Planning, University of California, Berkeley, December 1970, Working Paper No. 139, p. 1.

There has been a growing concern with these previously neglected areas in recent years among economists.[1] These efforts, begun notably by Muth,[2] Becker,[3] and Lancaster,[4] are highly suggestive and form the backdrop for our treatment of welfare generation processes. The key idea of this "household production" literature is that goods and service outputs do not directly provide utility or welfare to users; rather, they possess characteristics which give rise to their utility. The value of this idea is that it recognizes a set of processes in welfare generation which are directly analogous to the processes on the production side, which have long been the province of economic analysis.

Our modelling of the consumer's role in welfare generation takes this analogy more literally than many of those who have advanced the idea of "household production." Lancaster, for example, recognizes that the characteristics of goods (rather than the goods themselves) are inputs to household production; but then foregoes a considerable part of the advantage of this recognition by assuming away the active role of consumers by making the characteristics technical functions of the goods rather than functions of how consumers percieve and use them. Becker recognizes implicitly the role of the user in defining characteristics, but neglects the possibility of waste by the user--except in the limited sense of relative differences in information about production-side outputs.

Our own view is that the user's perceptions (as well as goods and services themselves) partially determine the characteristics of assets that are relevant to them.[5] They then employ differing levels of technology (i.e., are more or less efficient) in securing utility from the characteristics of goods and services which they control. An important implication of this is that people's level of welfare can vary for more reasons than are introduced into

1. Wesley Mitchell dropped some important hints to this subject area in his 1912 paper, "The Backward Art of Spending Money," American Economic Review, June 1912, pp. 276-77. These hints were only recently picked up by sophisticated members of the economics profession.

2. Richard F. Muth, "Household Production and Consumer Demand Function," Econometrica, Volume 34, Number 3, July 1966.

3. Gary S. Becker, "A Theory of the Allocation of Time," Economic Journal, 75 (September 1965), pp. 493-517.

4. Kelvin J. Lancaster, Consumer Demand: A New Approach (New York: Columbia University Press, 1971).

5. Here we are claiming that different people do see different plays, cars, etc., quite aside from their degree of like or dislike of what they perceive in them. This is different from their preferences which are, also, not uniform.

standard economic models. Perceptions of characteristics, as well as the goods and services available, vary. Technologies vary in moving from outputs to welfare outcomes, and preferences vary. Two people (or households) with the same bundle of assets and preferences can achieve different levels of welfare as a result of different perceptions or different levels of technology. This possibility is not typically included in economic analysis. In short, the assessment of the welfare consequences of differing asset levels requires knowledge about much more than asset bundles, gross preferences, and market prices, which are the variables customarily introduced in economically oriented assessments of public policy. Assessments need to be made of user perceptions (and their determinants), technologies, and relative differences in utilizing these technologies in addition to the variables normally included in economic analyses.

These variables are relevant, as we have suggested earlier, to choices about asset use made by organizations in pursuit of the welfare of the organization. That is, the service characteristics of organizational assets as perceived by various organizational actors may vary. Knowledge about how to use them to enhance the organization's welfare may vary and waste--relative to such welfare possibilities--may occur. It should be noted, also, that all of the activities of individuals generate potential changes in the individuals' welfare through the flow of satisfactions intrinsic to the activity itself regardless of the ostensible purpose of the activity.[1]

The search for relevant information on all of the determinants of these variables takes the analyst far afield from the traditional domains of economic analysis. An awareness of the need to include and assess this wider set of variables carries with it an awareness that, at least in the foreseeable future, all of the factors and relationships are unlikely to fit into any tidy equilibrium or optimizing model. We are at the stage, rather, of searching for clues (indicators) about the sources of variability and their

1. Elsewhere we have explored the derivation of satisfactions or dissatisfactions intrinsic to the activity and extrinsically derived from the output of the activity. Going to a dentist might be intrinsically dissatisfying while the resultant product of improved health may have positive value. See Michael J. Flax, Indicators of Job Satisfaction and Its Determinants: A Critique of the Literature and a Framework for Multidisciplinary Research (Washington, D.C.: The Urban Institute, June 1976).

determinants. One comes to this conclusion somewhat reluctantly, of course, because equilibrium and optimizing assumptions about behavior facilitate analysis. Models built on such assumptions have a certain elegance which is missing from the kind of structured classification models we are presenting here. Nevertheless, these models pick up most of the key classes of variables and form a basis for a structured examination and joint consideration of the literatures and findings of a number of disciplines when applied to a particular substantive area.

The major omission from the discussion so far is the absence of a discussion of the institutional structures within which the production and consumption of assets occur. This is the subject of the next section.

II

MODELS OF DECISION-MAKING ROLES
Uncertainty, Institutional Structure, and Information

The foregoing consideration of sources of variability in welfare generation which can be traced to the processes of transforming resources into welfare outcomes through production and consumption activities allows us to identify general classes of indicators. Individuals or households, however, rarely control the full chain of events that link initial resources to ultimate satisfactions in the generation of important aspects of people's welfare. In a society such as ours, control of the generation of welfare is subject to a highly complex division of labor in which individuals, households, bureaucratic units, and political bodies make decisions that affect particular aspects of these linkages. Specific actors tend to be interested in particular subsets of indicators identified by our welfare generation model. Consequently, we are faced with the problem of how to identify those indicator subsets that would be useful for specific decision-making responsibilities. In this Section, therefore, we extend the models to include sources of variability arising from the institutional settings in which welfare-generating activities occur.

In order to address these issues, we have attempted to integrate our model of the generation of welfare with one that could identify important institutional roles and behaviors that affect this process by partially synthesizing two important traditions of policy analysis: the analysis of choice under the conditions of scarcity which is central to economics (and reflected in our initial model), and the analysis of choice under the conditions of uncertainty which is primarily the concern of political and management science. In this Section we first sketch out what we take to be some of the critical ideas of organizational and political analysis--specifically the view that decision making can be addressed as an effort to cope with the uncertainty of purposive choice and that the very processes of choice, the structure of institutions, and the use of information can be interpreted as coping behaviors. We then combine these ideas with our model of the generation of welfare and

outline a general schema for identifying the kinds of information that might assist various actors in performing many bureaucratic and political roles.

Coping with Uncertainty

Our approach to the identification of the information requirements of different kinds of decision makers draws upon analytic perspectives common to management and political science, ones that view decision making as an effort to cope with the uncertainties of making purposive choices. Such perspectives are fundamental to approaches to organizational analysis developed by Herbert A. Simon, James G. March, and Richard M. Cyert[1] and the directly related approaches to political analysis developed by Robert A. Dahl and Charles E. Lindblom.[2] This discussion, however, draws heavily upon James D. Thompson's theoretical synthesis of organizational analysis which integrates a multiplicity of conceptual propositions and empirical findings developed by those who address decision-making behaviors as efforts to cope with uncertainty.[3]

Central to our approach are three key ideas:

(1) Decision making is a social process in which the uncertainties presented to actors are shaped by the social unit in which choices are made. In such terms, one can identify three sources of uncertainty--the internal structure of a social unit, its external environment, and knowledge about causal relationships available from the culture at large.

(2) Decision makers draw upon information to help them cope (reduce) with the uncertainties of purposive choices. Information is viewed as having two aspects--descriptive data and kinds of inference structures that order these data in terms of goals/means relationships.

(3) Uncertainties (and information that tends to reduce them) are not randomly distributed but are ordered by a division of labor shaped by our major social institutions. Therefore, one can identify different kinds of decision-making roles that tend to specialize in coping with

1. See, for example, Richard M. Cyert and James G. March, A Behavioral Theory of the Firm (Englewood Cliffs, N.J.: Prentice Hall, 1963), and Herbert A. Simon, Administrative Behaviors, second edition (New York: Macmillan, 1957).

2. Illustrative of this work is Robert Dahl and Charles E. Lindblom, Politics, Economics, and Welfare (New York: Harper, 1953).

3. James D. Thompson, Organizations in Action (New York: McGraw-Hill, 1967).

particular kinds of uncertainties and can specify the kinds of information that would assist in the performance of these roles.

Like economics, much organizational and political analysis views decision making as a purposive activity in which actors attempt to relate goals to available means in a more or less rational fashion. Economic analysis proceeds from the development of formal rules for rational choices which allow actors to optimize or maximize their objectives. In contrast, for much organizational and political analysis, how actors are to make choices is an open question. Analyzing operational rules of choice requires an assessment of decision making as a social process. Actors are viewed as coping with the particular uncertainties associated with the social unit in which choices are made. Different kinds of units--a regional office of a federal agency, a police precinct, a municipality, or an entire manufacturing firm--tend to present different decision makers with different sorts of uncertainties. Further, different patterns of uncertainty require different sorts of coping behaviors. Thus, "rationality" is viewed in terms of what constitute behaviors that are functional, given patterns of uncertainty associated with specific objectives, rather than conformance to particular rules of choice applicable to all circumstances.

Following Thompson,[4] we identify three broad sources of uncertainty associated with particular decision-making arenas (the social situations in which decisions are made). First is a social unit's internal structure, which can be described in terms of the characteristics of its elements. Are they homogeneous or heterogeneous? Are they many or few? Are they stable or unstable? Second is the character of the external environment. Salient dimensions would be its homogeneity or complexity, its stability or instability, and its responsiveness to decisions taken. The third source of uncertainty is the character of prevailing belief systems concerning causality which are present within the culture at large and potentially available to all decision makers. These can range from how to manage a national economy to how spring wheat is produced.

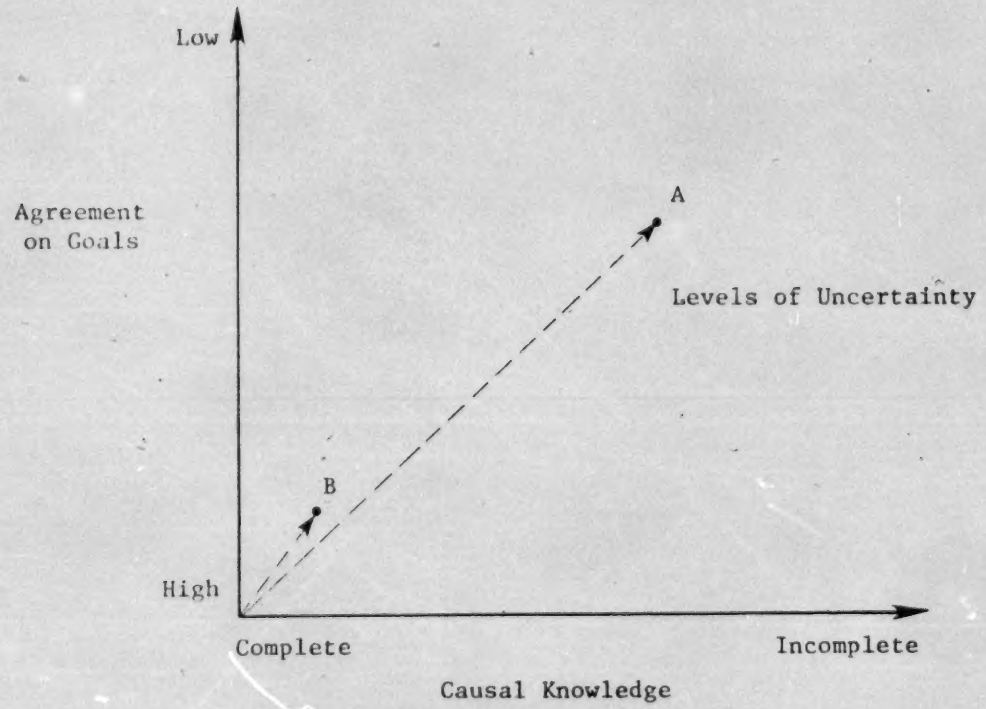
These three sources of uncertainty shape the character of the problems presented to actors within any specific decision-making arena. The joint

1. See Thompson, op. cit., especially pp. 159-61.

effects of these sources can be described in terms of the level of agreement on goals and the level of causal knowledge (arena-specific level of knowledge concerning goals/means relationships). Both of these dimensions are shaped by all three sources of uncertainty and can be represented graphically (see Figure 3).

Figure 3

Dimensions of Uncertainty



This representation can be used to describe the scope and character of uncertainty which might be present in any given decision-making arena. Point A might describe a highly uncertain situation in state and local political arenas in which urban growth issues are being addressed. Goals would tend to be both ambiguous and in conflict and the causal knowledge incomplete (as, for example, with local government decisions that focus on relationships between zoning changes and subsequent impacts on land use or population densities). A quite different situation would be present in an arena controlling the activities of a branch plant of a large automobile corporation. Goals are clear and unambiguous and the level of causal knowledge is fairly high. The low degree of uncertainty for this arena might be described by point B. This is simply to suggest that the uncertainties presented to a set of decision makers are shaped by the characteristics of the arenas in which they operate.

Rational or functional decision-making behaviors are reflected in the strategies people adopt to cope with the uncertainties presented to them. Implicit in these purposive behaviors are selections of appropriate descriptions of pertinent events or activities and decision-making procedures that can order these data in terms of important goals/means relationships. In the context of decision-making behavior, therefore, we can view information as having two components: (1) specific items of data and (2) the kinds of inference structures implicit in behaviors that order these data items in some model of the relationships between goals and means.

The selection of appropriate information for decision making is a subject of considerable intellectual dispute. Some analysts of organizational behavior argue that rationality in administrative decision making should be guided by a set of highly formalized procedures to achieve the maximum efficiency from a given level of resource inputs.[1] Others assert that, given the kinds of uncertainty facing organizational decision makers, such approaches are not functional. They suggest that decision makers would be best advised to approach choices in terms of a bounded rationality in which actors engage in a set of loosely structured procedures of searching and learning about

1. For a classic statement of this position, see Frederick W. Taylor, Scientific Management (New York: Harper and Row, 1911). Contemporary versions of this position are reflected in Charles J. Hitch and Roland N. McKean, Economics of Defense in a Nuclear Age (Boston: Atheneum, 1965).

solutions to problems.[1] Referring to arenas that command the authority of the state, political scientists debate the appropriateness of incremental versus goal-oriented processes in making public policy decisions.[2] The following discussion attempts to resolve some of these debates by exploring how the structure of different kinds of decision-making arenas generate situations in which some decision-making behaviors tend to be more functional than others.

It should be emphasized that we focus upon the demand for information in terms of decision-making behaviors that are deemed functional--that is, behaviors that support organizational or state purposes and involve the adoption of those kinds of inference structures and data items that most effectively reduce the uncertainty of making instrumental choices affecting these purposes. There are, of course, a variety of decision-making behaviors that are dysfunctional.[3] Actors can support purposes other than those defined by their organizational or political roles or they can adopt kinds of inference structures and data items inappropriate for the arenas in which they operate. Dysfunctional decision-making behavior alters the demand for information. Some political and organizational analysts do not view such alterations as permanent phenomena because decision-making processes are assumed to operate within self-correcting systems. Further, they assume that external demands made manifest through economic or political mechanisms force corrective action. The firm that fails to find satisfactory solutions to problems of coordination will suffer in the market place; political actors who fail to take into account well-articulated values will experience various repercussions. These analysts acknowledge, however, that some forms of dysfunctional behavior can persist

1. Perhaps the best known proponent of this position is Herbert A. Simon, The New Science of Management (New York: Harper and Row, 1960).

2. For a provocative crystalization of these debates in reference to the budgetary process, see Charles L. Schultze, The Politics and Economics of Public Spending (Washington, D.C.: The Brookings Institutions, 1968), and Aaron Wildavsky, The Politics of the Budgetary Process (Boston: Little Brown, 1964).

3. Understandings of dysfunctional decision-making behaviors are well-instructed by Michel Crozier's analysis of bureaucracy as a pathological institution. See particularly, Michel Crozier, The Bureaucratic Phenomena (Chicago: University of Chicago Press, 1967), Chapters 6 and 7. Also see discussions of the inherent inefficiencies of organizational and political institutions in Albert O. Hirschman, Exit, Voice and Loyalty: Response to Decline in Firms, Organizations, and States (Cambridge, Mass.: Harvard University Press, 1970).

for a period of time. For example, many organizational and political arenas are well insulated from external pressures or are able to so manipulate their environments that their influences are markedly reduced. In the long run the system in which they operate is assumed to be self-correcting, i.e., dysfunctional behavior is only a temporary aberration.

Our approach, however, makes no assumption that bureaucratic or political actors operate in a general social system that is inherently equilibrating or functional. The discussion below can simply be treated as a set of normative statements concerning the means employed by specific classes of decision makers to cope with their uncertainties; that is, we identify actions that ought to be taken by decision makers to support various organizational or political values. Our discussion does not provide a framework to fully describe actual decision making which is generally a mix of functional as well as dysfunctional behaviors. We do, however, offer a conceptual framework for identifying information--data items and inference structures--that can assist decision makers who are trying to support various organizational and political values and goals.

The scope of uncertainty associated with the purposive activities of any large-scale social unit--a society, a firm, a trade union, or a community association--is well beyond the coping capacities of any individual or group of decision makers. As a consequence, such purposive activities require a division of decision-making labor in which actors tend to specialize in coping with particular classes of uncertainty. The following provides a general model of the important elements of the division of labor involved in the formulation and implementation of public policy, the division of decision-making labor shaped by bureaucratic and political institutions.[1]

Institutional Structure and Information

Our first set of models views the generation of welfare in terms of production or consumption processes and identifies critical relationships between a variety of means and goals. Here we develop a model that characterizes how responsibility for decisions affecting particular objects of choice and means/goals relationships is allocated by the major social institutions involved in the formulation and implementation of public policy--formal organizations and the state. Further, this model specifies the particular kinds of uncertainties associated with these various responsibilities as well

1. General analysis of such divisions of labor is central to Talcott Parsons, Structure and Process in Modern Societies (New York: The Free Press, 1960).

as those decision-making behaviors that tend to reduce the uncertainties most effectively. Combining both our models then helps identify those data items (denoting the objects of choice) and inference structures (reflecting the process of choice among sets of means and goals) that tend to be functional in the performance of particular decision-making roles.

We noted earlier that organizations primarily engaged in production can be viewed as consumers of assets and that individuals within such organizations are engaged in consumption choices. Conversely, organizations or households primarily considered as consumption units also can be viewed as production units. In this Section, however, we adopt the convention of treating production organizations (e.g., an auto manufacturer or a hospital) as those relating resources to outputs and consumer organizations (e.g., a trade union or a neighborhood association) as those relating outputs to satisfactions.

A. Decision-making Arenas of Formal Organizations

Fully developed bureaucratic organizations (representing either producer or consumer groups) display a threefold division of labor to cope with various forms of uncertainty in a regularized fashion. From this perspective, one can identify decision-making arenas associated with three qualitatively different levels of authority and control--the operational, dealing with the performance of regularized tasks; the managerial, dealing with the coordination of interdependencies; and the institutional, mediating with the external environment.[1] The structural characteristics of this heirarchical set of arenas present decision makers with different kinds of uncertainty and requirements for functional behaviors (see Table 1).[2]

1. While the levels of formal organizations reflect a hierarchy of authority and responsibility, it would be a mistake to view such organizational structures as controlled entirely by top-down processes. Each level controls activities which, in the short run, can resist the directives of a higher level. Further, these levels emerge through a two-way interaction in which support can be given freely or withheld. Thus, each level is fully capable of interfering with the function of others.

2. Compare this treatment of the characteristics of information that would be functional in various decision-making arenas with Robert N. Anthony's discussion of the requirements for operational control, managerial control, and strategic planning within a firm. See his Planning and Control Systems: Framework for Analysis (Cambridge, Mass.: Harvard University Press, 1965). For an application of this analysis to government budgeting practices, see Allen Shick, "The Road to PPB: The Stages of Budget Reform," Public Administration Review, 26 (December 1966), pp. 243-58. Our analysis draws on Thompson, op. cit. and David O. Porter, Who Slices the Pie: A Study on Mobilizing Resources and the Politics of Budgeting (Detroit: Wayne State University, Center for Urban Studies, 1970).

Table 1

CHARACTERISTICS OF DECISION-MAKING ARENAS WITHIN FORMAL ORGANIZATIONS

Arenas	Structural Characteristics		Functional Decision Making	
	Functions Performed	Primary Sources of Uncertainty	Inference Structures	Performance Standards
Operational	Direct and control tasks which are regularized and standardized	Culturally available technology	Well-defined causal models, approaching closed system models for goods production	Universal (within culture) efficiency or effectiveness standards
Managerial	Manage linkages among operational level units and linkages with regular supplies of inputs and recipients of outputs	Regularized interdependencies within the organization and between the organization and its environment	A bounded rationality involving sequences of learning about problems and developing solutions	Organizationally specific instrumental tests of whether a solution was somehow satisfactory
Institutional	Mediate between the organization and its broader environment	Broader environment particularly the organization's sector of activity	Loose procedures of opportunistic surveillance to isolate major problems and opportunities	Sector specific tests dealing with command over assets and resources as well as with questions of organizational survival

Operational Arenas

Operational arenas direct the operating elements of formal organizations--a production facility or a retired workers' office of a trade union. Buffered from fluctuations in inputs or alterations in client demands, operational level actors are presented with relatively stable, homogeneous, and responsive external environments. The internal structures of operational arenas tend to be characterized by a fixed and generally small number of participants who display a high level of homogeneity, reflecting both the organization's selection processes and the sets of objectives defined by higher level actors. In addition, operational units tend to display limited complexity in that they conduct regularized tasks with a set of fairly standardized procedures. Goals are relatively clear and the level of causal knowledge is largely the function of culturally available belief systems concerning cause and effect relationships. Thus, performance standards tend to have a universal character. Goods-processing technologies, however, offer greater certainty and allow clearer performance standards than do people-processing technologies.[1] Decision makers in goods-producing organizations, therefore, tend to have a higher level of certainty than decision makers in either service-producing or consumer organizations, both of which are confronted with the uncertainty of processing people. Consequently, in the operational arenas of goods-producing organizations it is functional for decision makers to attempt to address choices with rigorous, closed-system inference structures that allow choices on the basis of fairly specific efficiency or effectiveness criteria. In the production of services, such as health or education, a more open inference structure would be appropriate along with less specific standards of performance. From the perspective of our welfare generation models, operational actors require well-defined sets of data items, which, for goods production, would include task-specific sets of data on resources provided, production transformation activities, goods, and retained inventories. For service production, the sets would include task-specific data on resources, provider transformation activities and retained inventories, along with measures of jointly produced attributes, client transformation activities, and satisfactions that are believed to influence the production tasks of the operational level.

1. This, of course, flows from our previous discussion of differences between goods and service production.

For consumer organizations, the data needs would include task-specific data items on member transformations and resources, as well as satisfactions, jointly produced attributes, and retained assets which belong to the membership and are believed to be directly linked to organizational tasks.

Managerial Arenas

Managerial arenas present more complex and difficult problems than operational arenas. They must control and administer an array of operational level tasks which involve (1) mediating between the operational level and those who use their outputs (for producer organizations this means consumers, while for consumer organizations it is membership) and those who supply specific inputs, and (2) allocating resources and responsibilities within the operational level. Managerial level uncertainties arise, therefore, from the need (1) to coordinate different groups of people engaged in multiple sets of regularized production or consumption tasks and (2) from the need to adjust these tasks to each other and to specific external demands from the suppliers of inputs and the direct recipients of outputs. In pursuing these activities managerial actors must come to terms with external environments of fairly high degrees of complexity and instability. While generally responsive, some elements of their external environments (particularly suppliers of inputs and users of outputs) can resist managerial decisions quite easily. The internal structure of managerial units tends to be characterized by a somewhat larger number of more diverse elements than are generally present within operational arenas. Some aspects of managerial level decision making are aided by culturally available belief systems (from disciplines such as operations research or management science), but these systems only partially address the uncertainties of complex and somewhat unstable open-system sets of relationships about which causal knowledge tends to be limited. Some ambiguity in goals results from the necessity of making adjustments and trade-offs in a wide variety of only partially understood relationships where exclusive reliance on well-defined, closed-system models of choice is dysfunctional. Functional modes of choice under these conditions have been described as a "bounded rationality" or as "satisficing" procedures which involve continuous monitoring of organizational tasks and direct environmental relationships in order to specify

problems of coordination and linkage.[1] Managerial choices would be directed toward finding satisfactory solutions to identified problems. Managerial level performance standards, thus, tend to be organization or problem specific since standards cannot be derived either from the body of available technology or from other organizations engaged in similar activities.

Managerial actors must relate to large sets of bounded production or consumption activities. This often involves the control of a range of fairly well regularized provider/client interactions and linkages with an external environment. As a result, managerial level actors in organizations producing goods must be able to monitor sets of data items specific to the organization concerning resources, production transformation activities, opportunities and constraints to production, goods, and retained inventories, as well as data items on client transformation activities and on those client opportunities and constraints that are thought to be directly linked to production tasks. Managers in service producing organizations must be able to monitor sets of data items specific to their organization with regard to resources, provider transformation activities, retained inventories, opportunities and constraints to production, as well as jointly produced attributes, client transformation activities, client related opportunities and constraints, and satisfactions believed to be directly linked to the activities of the providing unit. Managerial level decision makers in consumer organizations must be able to monitor a set of organizationally specific data items on the organizational resources, member transformation activities, opportunities and constraints to membership, retained assets, and jointly produced attributes, as well as data on production transformation activities and goods thought to be directly linked to organizational tasks.

Institutional Arenas

Institutional level arenas are the source of final authority and responsibility in formal organizations. They articulate and legitimize organizational

1. For elaborations of this approach to choice see Herbert Simon, The New Science of Management, (New York: Harper and Row, 1960) and Chester Barnard, The Functions of the Executive (Cambridge, Mass.: Harvard University Press, 1938). While both discussions deal with the decision-making behavior of organizational actors generally, their characterizations tend to be more appropriate for the behavior of managerial level actors.

purposes and mediate between the organization and its environment; they mobilize its resources and are responsible for its performance. These tasks often involve reshaping the organization's objectives or attempting to induce changes in its external environment. These actions often alter the boundaries of the organization or the scope of its sector (defined as other organizations with which either cooperative or competitive relationships are established, and with which the organization functions in a mutually shared environment).[1] Institutional level actors, consequently, operate at extremely high levels of uncertainty and face environments of great complexity and potential instability, many key aspects of which are unresponsive to their decisions. The internal structure of institutional arenas is quite variable, ranging from arenas characterized by a shifting array of many participants of a heterogeneous character to those characterized by a few individuals having common perspectives. Only limited elements of their decision making are aided by culturally available belief systems. Therefore, technology is very uncertain and goals tend to have a general and abstract quality.

One observer has assessed functional decision-making behavior at this level in terms of a theory of "organizational systems guidance,"[2] while another has defined it as "opportunistic surveillance."[3] These approaches involve an ongoing search for broad goals and means in order to isolate major problems and opportunities. Performance in this mode of choice is assessed according to the capacity of institutional decision makers to gain command over resources which for production organizations are those resources commanded by the organization itself, while for consumer organizations are the memberships' retained assets resulting from organizational efforts. Such assets might be both normative and utilitarian. For example, a firm might be assessed by how much wealth it has amassed as well as by its reputation for honesty. Specific performance criteria are developed with reference to other organizations in the same sector of purposive activity.

Institutional actors must scan broad arrays of data items concerning production tasks as well as data items pertaining to a wide range of

1. Compare with F. E. Emery and E. L. Trist, "The Causal Texture of Organizational Environments," Human Relations, 18 (1965), and discussions of organizational environments by Thompson, op. cit., pp. 25-38.

2. Bertram M. Gross, The Managing of Organizations, Volume 2 (Glencoe, Illinois: The Free Press, 1964), especially Chapter 28.

3. Thompson, op. cit., pp. 150-52.

provider/client interactions and to broad linkages with an external environment, some of which can be well removed from the regularized activities of the organization. Under such conditions, decision makers require broad displays of data on continually evolving sets of variables. Institutional actors in production organizations would be interested in the full range of production side data pertaining to both the organization and its sector as well as data items on client transformation activities, satisfactions, and opportunities and constraints for actual and potential clients of their goods and services. Institutional actors in consumer organizations would need broad displays of data concerning all member activity, data items pertaining to the organization and its sector, data on production transformation, resources, and opportunities and constraints to production that impinge upon the retained assets commanded by its membership.

Elaborations of Organizational Form

The above outlines the structural characteristics and functional decision-making behaviors for bureaucratic structures organized in a simple, vertically integrated form. Many formal organizations approximate this form. There are, however, numerous elaborations of organizational structure that make the information needs of decision makers more difficult to identify than we have suggested. While not fully discussed in this paper, characteristics of organizational structure and various adaptations in organizational form can be interpreted as efforts to cope with the sources of uncertainty we have treated--internal structure, external environment, and culturally available technology.[1] Such analysis is fully consistent with our treatment of decision making processes. Consequently, one can identify not only the information that would tend to be functional in coping with particular forms of uncertainty, but also one can specify (at least in general terms) the most appropriate organizational structure for the pursuit of particular organizational purposes. Highly uncertain culturally available technical knowledge suggests a need for extensive administrative decentralization at

1. See Thompson, op. cit., for a general theoretical discussion of these issues. Also see Alfred D. Chandler, Jr., Strategy and Structure (New York: Doubleday, Anchor Books edition, 1966); James W. Fesler, Area and Administration (University, Alabama: University of Alabama Press, 1959); and Oliver E. Williamson, Corporate Control and Business Behavior (Englewood Cliffs, N. J.: Prentice Hall, 1970).

the operational level so that appropriate task-related adjustments can be worked out. For example, a national retail firm confronted by significant regional variation in the characteristics of both customers and suppliers would do well to consider high levels of administrative decentralization from the managerial level down in order to cope with regular external relationships. Determining the information requirements in such cases entails an assessment of the specific sources of uncertainty confronting decision makers within particular arenas.

It should be noted that our assumptions about organizational behavior imply a need for a hierarchy of decision-making functions, but not necessarily a hierarchy of human relationships. We assume that all social units must perform three qualitatively different kinds of decision-making functions, with institutional level decisions controlling and setting the context for managerial level decisions which, in turn, are more encompassing than operational level decisions. These functions can be characterized as establishing linkages with the environment, coordinating interdependencies, and performing regularized tasks. Thus, we can assume that individuals, households, or other units engaged in purposive activities also have a need to perform these functions. While it is true that in many large formal organizations different groups of individuals perform these three functions, thereby forming a status hierarchy within the unit, it is also possible that an individual can participate in decisions at all three levels as in the case of large firms that are organized according to the principles of participatory management. Additionally, actors external to the organization can conceivably influence decisions at any level through political or market mechanisms.[1]

B. Political Decision-Making Arenas

Struggles to command the authority of the state and to define its interests take place in a matrix of political arenas. Unlike organizational arenas which are largely defined by organizational structure, political arenas emerge through the more informal processes of political interaction. The formal patterns of state authority do, however, provide a legal framework of control centers (or points of access to state authority) toward which

1. See, for example, David O. Porter, "Responsiveness to Citizen-Consumers in the Federal System," Publius, Vol. V, No. 4, Fall 1975.

actors within political arenas direct their efforts. Political arenas are, however, structurally independent of and qualitatively different from any organizational arena.[1] The primary functions performed within political arenas are the settlement of social conflict and/or making decisions that are intended to affect social outcomes.

The primary source of structural variation within political arenas and consequently the kinds of uncertainties presented to decision makers rest with the characteristics of the participants within the arenas. In these terms, there are two critical dimensions of the structure of political arenas--the number of participants, and the extent to which their demands reflect various mixes of particularistic values (pertaining to specific interests) or universalistic values (pertaining to collective interests). Particularistic demands can be thought of as emanating from what are essentially "bottom up" processes in which values are articulated and brought to bear upon the state through well-developed organizational processes. These demands are generally brought into political arenas by institutional level actors or their agents. Universalistic demands emanate from a variety of "top down" processes in which political level actors attempt to aggregate sets of particularistic interests or articulate interests pertaining to the entire collectivity.

The level of uncertainty which decision makers in political arenas must face is generally higher than that faced by any class of organizational decision makers. With the former, the external environments tend to be highly complex and unstable. Moreover, they are only slightly responsive to political decisions and present political decision makers with large sets of conflicting particularistic and universalistic demands, along with an uncertain and generally inadequate resource base. The internal structure of political arenas tends, further, to be characterized by a very large and unstable array of quite heterogeneous participants who draw upon belief systems that, at best, provide only fragmentary and incomplete knowledge concerning cause and effect relationships. Consequently, political decision makers draw upon a low level of causal knowledge and tend to reach little agreement on goals.

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1. The structure of public organizations devoted to production tends to contain the three organizational arenas discussed above.

The structure of political arenas varies and these variations are reflected in three general approaches employed by political actors to cope with uncertainty which can be labelled incrementalism, goal-oriented, and mixed-scanning.[1] These approaches, although rooted in abstract analyses of decision-making strategies, provide fairly accurate descriptions of actual political behaviors.

Given the uncertainty, ambiguity, and conflict that characterizes political arenas, actors often adopt a mode of choice labelled "incrementalism" or "the art of muddling through."[2] In formal discussions of this mode of choice, it is argued that decision makers face a set of widely divergent demands which they attempt to conciliate and compromise through competition and bargaining processes. Participants in these processes determine their options by analyzing the strength and diversity of currently articulated particularistic values rather than by focusing upon substantive outcomes. In order to reduce conflict, decision makers avoid discussion of universalistic goals defined in reference to an external environment. Their choices involve a complex series of short-run, incremental adjustments of state action, none of which are allowed to significantly threaten any well-established particularistic interest. Unguided by any overarching social goals, performance under this mode of choice must be judged in terms of keeping immediate conflicts within easily manageable limits, with the "good" decisions being those choices that all principal actors within the arena can agree upon.[3] In such circumstances the primary function performed by political actors is the management of social conflict.

In some smaller, homogeneous jurisdictions or in nations during times of war or profound internal crisis, political arenas reflect pressures based

1. To be consistent with the political science literature, we categorize political arenas in terms of their characteristic decision behaviors.

2. For a well-developed discussion of incrementalism, see Charles E. Lindblom, The Intelligence of Democracy (New York: Macmillan, 1965), or his "The Science of Muddling Through," Public Administration Review, 19 (Spring 1959), pp. 79-88.

3. There has been considerable criticism of both the theory and practice of incrementalism in terms of its failure to consider substantive outcomes in the decision-making process. Some of this criticism, however, fails to recognize adequately how the practices of continual short-run compromises and log rolling have served to maintain democratic norms.

upon consensual collective demands of citizens who are willing to accept goals articulated by political leadership. Given such situations, political level decision makers might attempt to guide state actions in terms of the assumed instrumental effects those actions will have on widely held universalistic goals pertaining to aggregate production or consumption activities. Performance is thus judged on the ability of decision makers to achieve desired outcomes, such as winning a war or combatting economic depression. Given the fact that pursuing such outcomes entails coping with vast areas of uncertainty associated with a highly complex external environment, effective instrumental actions must be limited to controlling or channelling the institutional level choices of limited sets of organizations and/or altering the opportunities or constraints which affect individual and group behavior. Efforts to achieve more detailed control of subordinated actors would involve levels of uncertainty beyond the capacities of any group of decision makers.

Implicit in this argument is that both goal-oriented and incremental political decision making are adaptive in character. The distinguishing characteristic of incremental decision making is that it entails sequences of decisions focusing solely on securing agreements within a particular arena. Goal-oriented decision making entails analogous processes that focus on some outcome external to the decision-making arena, i.e., they involve incremental adjustments of state action thought to move in the direction of some desired social outcome external to the arena. Clearly, such goals are modified and clarified over time and this, in turn, requires subsequent shifts in state action.

In few, if any, political arenas do totally particularistic or universalistic demands predominate. More commonly, decision makers are presented with a mix of particularistic demands along with a set of well-articulated universalistic demands. Decision makers, therefore, employ a combination of incremental and goal-oriented modes of choice. This combined mode has been described by one writer as "mixed scanning."[1] It requires the specification of broad social goals, with instrumental choices being constrained by the necessity of making incremental adjustments to particularistic interests.

1. Amitai Etzioni, The Active Society (New York: The Free Press, 1968), especially pp. 282-90.

A division of labor within arenas is often required, with one group of actors making incremental adjustments to choices affecting current policy and another group attempting to shape goals to guide future choice. Much of the decision-making behavior of the U.S. Congress can be viewed in such terms. Some committees (such as those involved in appropriation) tend to engage in incremental approaches, while other committees (particularly those in substantive policy areas) lean toward longer term, goal-shaping efforts.

Information for Political Actors

The above suggests several propositions about the kinds of inference structures and data items that are functional in political arenas. When particularistic demands predominate, political level decision makers concentrate primarily on managing the process of choice and not upon external outcomes. The outcomes of a decision are judged only by their capacity to accommodate particularistic interests representing the institutional level concerns of formal organizations. As a result, political level actors performing mediation functions adopt the inference structures and concentrate on those data items presented by a variety of institutional level actors. They focus primarily on institutional level information pertaining to the particularistic interests they represent or must confront in political interactions.

When universalistic demands predominate, political level actors concentrate upon the assumed impacts on society of various state actions and tend to downplay the consideration of impacts upon particularistic interests. Here they adopt rough macroscopic models that address the relationship between state action and social conditions (with the possible specification of sectoral influences). To be sure such models vary in their complexity, ranging from fairly simplistic ideas (e.g., that the way to improve the health of the population is to build more hospitals) to Keynesian economics. Given the scope and magnitude of the uncertainty presented to political actors, such models can be treated only as rough heuristic devices regardless of their sophistication. They help order sets of data on a multiplicity of goals and means to permit the monitoring and assessment of the impacts of a series of policy adaptations. These models require broad arrays of data that can be aggregated for the total society and disaggregated to major production and consumption sectors

as well as to jurisdictional units. Therefore, political level actors can potentially find all classes of data items of interest but would tend to concentrate on resources, goods, jointly produced attributes, and satisfactions. To further define information requirements requires an identification of the specific uncertainties confronting political actors and the inference structures they employ.

III

INFORMATION AND PERFORMANCE INDICATORS FOR A PROTOTYPICAL SCHOOL SYSTEM

The previous discussion brought together our models of the generation of welfare and institutional structure in order to develop some general propositions about the different information requirements associated with various decision-making roles. This section attempts to illustrate the potential usefulness of our models through a discussion of those information requirements and those indicators of performance that are associated with roles performed in a prototypical public school system. We believe that our distinctions among social, institutional, and political performance can help to clarify the discussion and analysis of many important policy issues. Rather than emphasizing the substantive content of educational issues, we stress how our conceptual framework can be employed to structure examinations of means/goals relationships in the context of particular organizational and political arrangements. It is our intent that this approach might suggest to readers how our models might be employed to formulate issues and questions in their own areas of concern.

This discussion illustrates three important implications of our models. A fine grained identification of information requirements involves analysis of how coping with specific uncertainties generates demands for particular subsets of indicators that might be identified by our welfare generation models. Second, our conception of the decision-making functions performed in a formal organization provides a framework for assessing decision making by actors in less formalized roles. Finally, if we view the relationships among these roles in terms of interactions with a hierarchical institutional arrangement and between clients and providers, then we can distinguish indicators of social (as opposed to institutional) performance.[1] Indicators of institutional performance can be employed to achieve administrative control of production

1. Given the complexity of our models and the variability of actual institutional arrangements, we limit the illustration to overviews of our methodological approaches. The discussion is further limited by focusing on decision making and performance issues as they apply to an organized and familiar institution--a prototypical public school system. Our analysis of information does not encompass the full range of information required by a service client; rather it focuses on performance issues most salient to clients.

units, while indicators of social performance can be used to hold these units accountable for contributions to client welfare.

The first step in the exercise is to map out a general classification of indicators and goals/means relationships which are marked off by our welfare generation models. From the perspective of these models, learning involves the production of service outputs. The production activity--education--refers to specialized efforts to impart skills and knowledge and efforts by students to acquire them. The interaction between these activities leads to various jointly produced outputs including cognitive and manual skills, substantive knowledge, social norms and values, and satisfactions intrinsic to the interaction. These activities produce different external effects and are subject to different opportunities and constraints. Service outputs in terms of levels of learning are often linked to welfare in subsequent transformation processes; for example, substantive skills learned in schools might be subsequently employed in jobs, community activities, or child rearing.

Our welfare generation model identifies a multiplicity of means/goals relationships within a very general set of education indicators. The problem is how to determine those relationships important to any particular decision maker. The selection of a public school system to illustrate our approach provides some initial criteria in terms of a geographically bounded locale that provides students, tax support, and local political demands. Aside from this, one has to turn to the structural characteristics of the school system itself, interactions with its various clients, and the characteristics of the political processes that affect the schools' activities.

A. Information Requirements and Indicators of Institutional Performance for Organizational Decision Makers

Given the fairly simple, vertically integrated structure of our example, the following identifies the information requirements and indicators of institutional performance that might be associated with representative operational, managerial, and institutional arenas that directly control the activities of a public school system.

Information Requirements of Operational Level Actors

Operational arenas direct the regularized, ongoing activities of an organization and control the most specialized and bounded sets of production activities. In our prototypical school system these might involve a

particular school's instructional activities undertaken from kindergarten to the sixth grade, the operation of a fleet of school buses, or the coordination of high school athletics programs. Generally, these arenas require task-specific data on resource inputs, production activities (both school and client related), retained inventories, jointly produced attributes, satisfactions, and opportunities and constraints for production.

A representative operational arena, such as one that controls the instructional activities of a primary school, might require the following kinds of data sets (Table 2). Further specification of the information requirements for operational actors requires an assessment of the specific uncertainties associated with the conduct of particular instructional activities. Major sources of uncertainty rest with culturally available belief systems concerning cause and effect relationships. If it is assumed, for example, that skills and knowledge are produced through a set of standardized procedures, then operational actors would only have to cope with fairly low levels of uncertainty. Their decisions would involve certain routinized adjustments of production activities assumed to optimize educational outcomes. Institutional performance would tend to be reflected by scores on a few standardized test instruments selected by school officials. Actors in such circumstances would require limited and stable sets of data concerning resource inputs, production activities of school employees and students, jointly produced attributes, and satisfactions. On the other hand, if it is assumed that educational technology at the operational level is very uncertain and requires constant mutual adjustments between student and provider production activities, then demand for information would be far more extensive and considerably less stable. Actors in such circumstances would require detailed sets of data on all items that can be linked easily with the specific instructional events and the performance of individual students. Hence, there might be a multiplicity of measures of institutional performance reflecting a wide variety of objectives that emerge from student/teacher interaction.

In cases of low levels of assumed uncertainty, useful analysis of performance issues would involve repetitive application of a standard optimization model focused upon a few commensurable objectives. Such an analysis might be very similar to one for assessing the performance of an operational level unit of a goods-producing organization. High levels of assumed uncertainty demand an analysis involving the sequential applications of unique models that can take into account several noncommensurable objectives.

Table 2

ILLUSTRATIVE OPERATIONAL-LEVEL INDICATORS

Task Specific Data on:	Examples
Resource Inputs	Number of teachers assigned to school by level of training and years of experience
Production Activities (school and client related)	Hours spent by teachers in various kinds of instructional activities, attendance, truancy, and turnover rates of students
Jointly Produced Attributes	Student test scores on selected standardized performance tests
Satisfactions	Students' attitudes toward school

Further, it must be recognized that the valuation of particular objectives would probably vary considerably between students, parents, and teachers. Given the obvious costs of conducting such analysis, only a small proportion of pertinent means/goals concerns can be subjected to formal study. Consequently, when it is assumed that culturally available technologies are highly uncertain, there are important aspects of operational level performance assessment which tend to be judgmental in character.

Information Requirements of Managerial Level Actors

Managerial level actors confront uncertainties that arise from linkages between operational tasks and between these tasks and their direct links with the environment. Here decision making involves a searching and learning process to isolate and develop satisfactory solutions to problems arising from interdependencies within the organization, on the one hand, and between the organization and the regular suppliers of inputs and the recipients of outputs on the other. Usually managerial level actors must conduct ongoing reviews of organizationally specific sets of information on resources, production activities, production opportunities and constraints (both school and student related), retained inventories, jointly produced attributes, and satisfactions.

Given the potential range and complexity of interdependencies addressed at the managerial level, it is generally more difficult to anticipate the

information needs of managerial actors. There might be a number of managerial arenas with responsibilities that could include operating the physical plant, administering secondary education, or establishing a system-wide math and science program. A managerial arena controlling primary education might require the data elements shown in Table 3.

Table 3

ILLUSTRATIVE MANAGERIAL-LEVEL INDICATORS

Organization-Specific Data on:	Examples
Resource Inputs	Per pupil expenditures on supplies for primary instructional units
Production Activities (school and client related)	Classroom hours per year allocated to reading instruction by grade level, truancy rates per instruction unit by race and income of parents
School-related Opportunities and Constraints	Number of new job applicants by level of training and years of experience
Student-related Opportunities and Constraints	Enrollments in private nursery schools by areas served by instructional units
Jointly Produced Attributes	Subsequent performance in higher grades by source of prior instruction
Satisfactions	Educational aspirations of students by race and parental income, for each instructional unit

Like the operational arena, further specification of the information requirements of actors within such a managerial arena requires assessment of their particular sources of uncertainty, i.e., a detailed assessment of the internal structure of the school system to identify key interdependencies among various organizational tasks and the direct linkages between the organization and its immediate environment. Interdependencies that involve a few stable elements generate limited information demands, while complex and unstable interdependencies tend to generate fairly extensive demands. Institutional measures of performance indicate whether the problems resulting from these interdependencies are resolved in a satisfactory fashion. For example, if a primary school serves an area with stable and homogeneous population characteristics, then managerial actors will require only limited sets of data on the incoming school population and its relationship to the allocation of teachers and classrooms. Performance might then be deemed satisfactory if

class size varies by three or fewer pupils and less than one percent of the teachers have to be shifted during the year. If, however, the area served by the school is particularly heterogeneous and unstable, then managerial actors might require weekly sets of data on the characteristics of the incoming school population and its relationship to the allocation of manpower and space. Subsequent data sets would be required to readjust allocations of classroom instructional time to sequences of educational activities set out in various curricula plans. Performance under such circumstances might be deemed satisfactory if class size varies by eight or fewer students, less than five percent of the teachers have to be shifted during the year, and at least one-half of the students do not experience a major disruption in their curriculum.

In the former, more stable case, analysis of manpower and space allocation would be a fairly simple exercise, requiring only the most rudimentary analytic model. The latter case requires developing a fairly complex model that can take into account changes in key independent variables. While not yielding valid optimal solutions, such a model can be used to demonstrate the important trade-offs that must be taken into account by various administrative responses. Since solutions to such trade-offs tend to be unique to a particular school system, performance standards initially would be somewhat arbitrary; subsequently, they would require adjustment to the constraints of the situations confronted by administrators.

Information Requirements of Institutional Level Actors

Institutional level actors formulate broad policy decisions affecting the mobilization of resources, the specification of objectives, and the establishment of organizational procedures with which to mediate between the organization and its environment. The critical task in determining the information requirements of institutional decision makers is assessing the organization's environment. Organizational environments can be defined as sectors bounded by other institutions and groups with which cooperative or competitive relationships are established. In general terms, institutional actors direct their energies toward major organizational problems or opportunities, and their information requirements are neither regular nor easily predictable. As institutional level decisions become more structured and repetitive, they are generally turned over to the operational or managerial level actors. An institutional level decision maker in our prototypical

school system would potentially be interested in the full range of production data pertaining to the school system and its sector as well as in the data items on student activities and satisfactions illustrated in Table 4.

Table 4

ILLUSTRATIVE INSTITUTIONAL-LEVEL INDICATORS

Organization and Sector Specific Data on:	Examples
Resources	Share of state aid allocated to school system
Production Activities (school and client related)	Share of teacher time devoted to nonclassroom activities, drop-out rates for comparable school systems in state
School-related Opportunities and Constraints	Regional wage structure
Retained Inventories	Changes in cash value of inventories of disposable materials
External Effects of Production (school and client related)	Impacts on local land values by school construction, vandalisms by students going to and from school
Jointly Produced Attributes	College acceptance rates of comparable school systems in state
Satisfactions	Student attitudes toward school authorities

Specifying the particular information requirements of institutional level actors requires a careful assessment of transactions between the school system and its sectors and how they affect uncertainty for decision making, i.e., the organization's command over resources or its chances for survival. These transactions tend to be highly variable from one organization to another, being shaped by the characteristics of the environment, the behavior of institutional actors themselves, and the relative weights of different sources of uncertainty. School systems, for example, exist in rather different local environments that shape the availability of local tax resources. One district might have a huge potential local tax base relative to the school population, while another might have a very limited local tax base. Decision makers in the former system would be occasionally interested in sets of data on the impacts of school expenditures on the local tax burden.

Actors in the latter system might require regular and extensive information on alternative fiscal support (such as state aid and federal grants). Many large center-city school systems are so structured that parents or pupils do not constitute important elements in a school system's environment, i.e., they cannot influence resource flows or affect the legitimacy of the schools. On the other hand, some smaller suburban jurisdictions are so structured that parents and students can significantly influence these processes, with the result that decision makers require information on the concerns of parents and students.

Institutional actors do not always react passively to external pressure but can shape their own environment to a considerable degree. One set of institutional actors in a school system might constantly engage in activities to broaden their environment, such as attempting to establish a junior college or pursuing private foundation support for new programs. Other actors in the same roles in that school system might limit their environment by not attempting to expand the client groups served or by not searching for new sources of additional resources. While performance at the institutional level reflects command over resources, the latter actors might deem a five percent increase in the annual operating budget satisfactory, while the former might think that satisfactory performance should entail a national reputation for educational innovation along with a ten percent increase in their operating budgets.[1]

Finally, the information demands of institutional actors are shaped by their greatest source of uncertainty. For some school districts, the greatest uncertainty rests with the availability of fiscal resources, while in others it might rest with the availability of space. Actors in the former system would, therefore, require particularly rich sets of data on flows and allocations of fiscal resources, while actors in the latter might require highly detailed sets of data (current and projected) on building and transportation capacities.

Analysis of institutional-level problems tends to be far more speculative than that required at either the operational or managerial levels. A district faced by particularly difficult space problems might require a

1. Obviously, the sectors of some organizations would not allow such latitude in performance, e.g., firms in a highly competitive market, such as the ladies' garment industry.

fairly large-scale simulation of the interaction of changes in the school population, transportation capacity, and current building capacity. These interactions would be constrained by the time needed to alter transportation and building capacities under various assumptions concerning the rate and cost of change as well as possible alterations in the school schedule. The district facing acute fiscal problems must address generally higher levels of uncertainty. In this case, analysis might be framed in terms of alternative scenarios involving alterations to both revenue and expenditure structures. When some kind of decision is reached on the basis of such analysis, institutional actors turn the execution of their decisions over to managerial actors or attempt to move the issue to a political arena; at that point they attempt to direct their interest toward other issues.[1]

B. Assessing Social Performance

Our previous analysis is essentially static so that we could determine the information requirements and performance indicators for specific organizational arenas. In effect, we press our analysis of decision arenas against our model of the generation of welfare and, somewhat in cookie cutter fashion, isolate those means/goals relationships and associated indicators that tend to be useful to different kinds of decision makers. Assessment of social performance, however, must address more dynamic considerations involving the interactions of various client roles with the activities of production units. This involves tracing the generation of welfare through specific roles in patterns of provider/client interaction.

We begin with client analogs of hierarchal roles in decision-making arenas of producer units and relate these client roles to the characteristics of the production unit. Clients perform many roles vis-à-vis a school system, ranging from that of an ethnic association member to that of a parent of a school child. Associated with these roles are multiple value concerns about education, perhaps involving the skill level they want their children to achieve, the distribution of resources among neighborhood schools, or the cultural content offered in a social studies curriculum.

Given particular client roles, indicators of social performance involve relationships between the activities of a specialized production unit, such

1. The ability to shift institutional level problems into political arenas is one of the most significant differences between public and private sector administration.

as a school system, and (1) personal assets of individuals and households, (2) the use of such assets, and (3) satisfactions associated with the production or use of such assets. The activities of a school can conceivably affect the personal assets of individuals and households by enhancing specific skills or by taking up time that might otherwise be spent on other activities. The outputs of educational activities such as work norms or computational skills are personal assets, the value of which is largely defined by their subsequent use in job or family activities. Finally, both the processes of producing these assets and their subsequent use generate various kinds of satisfactions and dissatisfactions. Such relationships are suggested by the active value-adding and asset-consuming functions of individuals and households described by our models of the general of welfare.

To deal systematically with the complexity of assessing social performance, one must begin with client analogs of the hierarchal roles performed in decision-making arenas of producer units and relate these client roles to the characteristics of the production unit.

Operational Level Social Performance

Specifying indicators of operational-level social performance begins by identifying the client units that perform the regularized tasks of producing and using educational outputs. In this case one can assume that the household or individual student is the appropriate operational-level client unit. Developing initial sets of performance indicators requires an assessment of whether the school system's operational-level activities reflect the preferences and meet the expectations of households and individuals. This would be indicated by information on various satisfactions and jointly produced attributes disaggregated to the individual client. If client preferences and expectations are met at the operational level, then additional analysis would not be required. If the operational level activities of the school system are deemed unsatisfactory, however, then several sets of additional questions must be pursued. These deal with the distribution of client preferences and belief systems regarding the educational process.

In a society such as ours, the clients of educational services would tend to have a wide range of particularistic values regarding education at the operational level. This range not only reflects a pluralism of social values (such as those associated with race, social status, or ethnicity) but

also might reflect differences in individual preferences as fine grained as the different preferences parents might hold for children in the same family. Associated with this diversity of preferences might be belief systems that define education as a highly uncertain process requiring continuous production activity adjustments to meet the preferences and needs of individual students. In such circumstances, important performance indicators would reflect choices clients can make in securing educational services, i.e., what is the range of available options, how often are they exercised, and at what cost in time or money? Illustrative of such indicators are the number of private and public education choices potentially available to clients without having to change residence, the actual number of times clients exercise such choices within the public school system or through the purchase of private educational services, and the number of man hours required to affect such choices within a public school.

Such indicators are, of course, largely dependent on how the school system is structured at the operational level. For example, if it is assumed in the school system that skills and knowledge are produced by performing a set of standardized tasks, then potential operational level client choices are highly constrained and their exercise involves high costs. These costs might be reflected by the time it takes to affect an institutional level arena in order to secure a small adjustment in operational level services, or the dollar cost of private school tuition. Such indicators would be at the heart of discussions of a possible restructuring of public school systems through the introduction of educational vouchers.

Managerial Level Social Performance

At the managerial level the household or individual student is again the primary unit, having to cope with the interdependencies of the tasks involved in the production and use of educational outputs. For most clients of primary and secondary education, these interdependencies present relatively few difficulties. Schools can, of course, solve some interdependency problems by shifting them to clients as in the case where scheduling difficulties are resolved by forcing students to travel long distances or wait considerable periods between classes. Sometimes interdependencies are central to educational performance, however, as in the case of a migrant worker's child who

is enrolled in ten primary schools in one year. Another example might be the part-time college student who attempts to develop a coherent engineering degree program over an eight year period during which the college alters its curriculum four times in response to new industrial technologies. Here, important indicators of performance would measure various satisfactions and jointly produced attributes disaggregated to the household or individual as well as measures of the continuity and coherence of the educational process, e.g., the number of changes in a planned curriculum or the number of different teachers encountered at the same grade level.

Problems of client interdependencies are greatly affected by how managerial level actors within the school system cope with the interdependencies of producing educational services. But solutions to these problems might not be within the capacities of managerial level actors. The problems of the migrant child and the part-time engineering student might have been eliminated if educational services were standardized for similar educational systems over time. Such standardization might, however, conflict with requirements for flexibility in the educational process emanating from the operational level, or with needs to adapt to external demands emanating from the institutional level. This simply underscores the complex mediating functions that must be performed at the managerial level. Occasionally, structural solutions to client interdependencies are impossible or costly. There simply might not be a solution to the problems of the part-time engineering student while those of a migrant child might require a national system of migratory educational services. This latter solution would, however, be pursued initially within political level arenas, suggesting that some problems of interdependencies ultimately must reflect political rather than managerial or institutional performance.

Institutional Level Social Performance

People interact with a school system in more collective roles, e.g., members of an ethnic group, residents of a particular neighborhood, or representatives of a local industry. These roles reflect institutional level client concerns; that is, the school system represents an important element in the environment of an ethnic group, a neighborhood, or a firm. At this level, clients make a far more diverse set of demands upon the school system than do those previously discussed, i.e., clients directly involved in the

transformation of specific services into various educational outcomes. In their institutional roles, clients tend to view performance in terms of the command over various normative or utilitarian assets and the development of collective attributes.[1] These are indicated by measures of jointly produced attributes or retained assets pertinent to the activities of client groups. A neighborhood association might be interested in the external effects of a school construction program on local land values. A teachers' union might focus on the salary and benefit levels provided to teachers. An ethnic group might focus on those cultural norms inculcated by the school that affect the survival of its ethnic identity. A local firm might be concerned about the skills and attitudes toward work being developed in students who represent their future employees.

At these levels, the ability of clients in their collective roles to secure a response from the school system is dependent upon their capacity to introduce uncertainty into institutional arenas. Since political arenas often provide primary channels to insitutional level actors, this capacity is reflected in the structure of political as well as institutional arenas. Therefore, the pertinent questions deal with whether the group represents a key element in the sector perceived by institutional actors in the school system or represents an important element in the structural underpinnings of the political arenas that provide general guidance to subordinated school officials. Ability to create sectoral instability for institutional actors would be directly reflected in the total and marginal share of the school system's resources that can be influenced by the client group.[2] Illustrative indicators of this influence would be a group's share of local taxes contributed to the school district or the number of local school board elections in which a client group's votes represented the margin of victory. Influence through political arenas is difficult to determine directly. Indicators could be developed by measuring perceptions of a group's influence or the frequency with which a representative of a group participates in important decisions.

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1. Much of the pressure for school decentralization reflects efforts by client groups to secure command over resources, rather than concerns about the education of individual students.

2. Analogous issues pertain to private sector organizations, with market mechanisms obviously a far more important determinant of client influence.

C. Information and Performance Indicators for Political Actors

A number of political arenas mediate between public organizations (such as our prototypical school system) and groups and institutions that constitute significant elements of their environment.

The functions of political arenas are to settle social conflicts and/or to make decisions intended to affect social outcomes. Consequently, political level performance, in terms of the success of conflict settlement or relating state actions to social outcomes, can be distinguished from institutional or social performance, although related to both. Generally crystalized around local, state, and federal jurisdictions, such arenas are characterized by levels of uncertainty that tend to be significantly greater than those present within organizational arenas. Within political arenas, both client and provider interests are represented. Therefore, political level actors generate demands for all categories of information. Our schema, however, provides only limited guidance for specifying even the general classes of data sets that would be useful to such actors. That specification must start by assessing the particular constellation of interests that shape the structural underpinnings of political arenas and the strategies employed by decision makers to cope with the uncertainties presented by the demands of those interests.

While a particular school system might be required to interact with a number of political arenas, the following discussion is limited to a single arena in which struggles take place to command the authority of a local school system.

When the constellation of interests within a political arena reflects the demands of a shifting array of widely divergent particularistic interests, decision makers are presented with unusually high levels of uncertainty. Incremental approaches to choice are functional in such situations. Without the articulation of any agreed upon goals, decision makers ignore the broader impacts of the school's activities and focus on how incremental adjustments of existing policies affect the demands of established particularistic interests. Decisions are limited as much as possible by short run reactions to narrowly defined issues or problems. Impetus for formulating many of these issues emanates not from within political arenas, but from

institutional arenas of organizations including that of the school system itself. Within political arenas, demands reflect the institutional level concerns of both client and provider interests. A decision about the issuance of bonds for new construction might elicit the following kinds of information demands related to institutional or social performance. A teacher's association might require estimates of the consequences of bonding approaches for the availability of discretionary funds to improve teachers' salaries. A home-owners' association might be concerned about its impacts on local property tax rates, while a construction firm might be concerned about how the levels of projected new construction affect its capacity to bid on projects. Other issues such as the development of a sex education curriculum or the location of a new primary school might bring forth a different mix of interests, producing quite different demands for information.[1]

A local political arena might display a political substructure radically different from the one discussed above. This would reflect a consensus upon some set of more universalistic values, such as the set that might develop within a homogeneous upper middle-class suburban jurisdiction. Here there might be well articulated demands for levels of educational performance that would maintain or enhance the social status of the children of the community and would reflect values which encompass both provider and client interests. This situation would facilitate a goal-oriented mode of choice in which political actors external to the school system interact to formulate sets of issues that focus on those performance objectives which relate to outcomes external to the decision-making process. Such actors would have an ongoing interest in sets of performance related indicators that reflect how well the school is preparing children for social and economic roles similar to those of their parents. These indicators might refer to any category in our classificatory model as illustrated in Table 5.

Goal-oriented political decision making tends to be adaptive in character and requires a general set of performance indicators marking broadly defined means/goals relationships. Also needed are more detailed sets of data related to those specific problems or opportunities which provide a focus for decision making. Demands for such data tend to be episodic and, therefore, difficult

1. These examples suggest that given certain constellations of interests within political arenas, issues directly regarding the educational process might not play a prominant part in decision making.

Table 5

ILLUSTRATIVE POLITICAL-LEVEL INDICATORS
(Consensus Present)

Organization, and Sector Specific Data on:	Examples
Resources	Percent of faculty MA or Ph.D. graduates from prestige institutions
Production Activities (school and client related)	Teacher time allocated to the supporting individual science research projects, number of student-initiated requests for new courses in programs
Retained Inventories	Depreciation of capital equipment in terms of increased expenditures for repairs
School Related Opportunities and Constraints	Level of tax effort of the twenty highest spending school systems in the state
External Effects of Production (school and client related)	Time spent by faculty in outside employment, number of students participating in summer programs of local colleges
Jointly Produced Attributes	Per capita national merit scholarship finalists of top ten high schools in the state
Student Related Opportunities and Constraints	Number of students who speak a foreign language
Satisfactions	Beliefs of students concerning the quality of their educational experience

to predict. A change in the acceptance procedures of a prestige university, for example, might generate demands for detailed sets of data related to specific curricula; or the threat of a cutback in state aid for vocational education might generate demands for detailed information on alternative funding sources.

Analysis, then, should help in developing overviews of goals and means and their relationship to specific problems or opportunities. Decisions to increase expenditures for the purpose of reducing class size must be assessed in terms of their various consequences for learning levels, staff morale, public support for school expenditures, student satisfaction, capital equipment usage, and so forth. The problem is that formal analysis can rarely

establish the character of the relationships in a definitive fashion. It can, however, provide a framework within which decision makers can address problems in a more orderly fashion and can also provide some general estimates of the scope of uncertainty inherent in the choices made. Subsequently the adaptative processes of decision making and assessment can further refine these frameworks as particular uncertainties are reduced through actual experience. These processes, however, tend to reveal new areas of uncertainty; consequently the highly uncertain character of political choice remains.

IV

TOWARDS MORE COMPLETE ANALYSES OF PROGRAMS AND POLICIES

A conceptual framework for identifying indicators relevant to the issues of policy development and program management must address the analytic problems of tracing chains of interactions from resource inputs to satisfactions. We believe that these problems are not only central to indicator research but also central to benefit/cost analysis, evaluation research, and policy analysis generally. We also observe that approaches to these problems based on a single discipline tend to overlook important considerations, such as the failure of political scientists to deal with the consequences of political processes for the distribution of resources or levels of welfare. What is required is the development of bridging paradigms which representatives of different disciplines can learn and use. These paradigms would have to define important relationships among the key conceptual and methodological concerns of those research traditions which have demonstrated a capacity to address important policy considerations (particularly economics, political science, and management science). These paradigms would allow for both the effective integration of discrete pieces of analysis conducted within the narrower bounds of several disciplines and would facilitate research based on models that combine the analytic power of those disciplines.

We describe and illustrate the major features of such a framework. It attempts to bridge two broad and important traditions of policy research--the analysis of choice under conditions of scarcity and the analysis of choice under conditions of uncertainty. This synthesis provides tools for simultaneously focusing on the objects of decisons in terms of various means/goals relationships and on the processes of choice in terms of institutionally structured decision making.

Developing this framework begins with the elaboration of a traditional microeconomic model of production processes. Our model addresses the generation of welfare through two analogous but structurally independent transformations----the transformation of resources into goods and services by specialized units and the subsequent transformation of the characteristics

of goods and services by individuals and households into various welfare outcomes. It permits the exploration of questions pertaining to the role of individuals and households in the generation of their own welfare and also for the specification of important differences between the production of goods and of services. This model is then integrated with a second that identifies important bureaucratic and political roles and institutional structures. These roles and structures affect the generation of welfare by patterning the uncertainties associated with the various purposive choices that must be addressed in production and consumption processes. This permits us to specify the information requirements of different kinds of decision makers and to identify the impacts of key means/goals relationships and institutional structures on either social or institutional performance.

Our framework has important implications for policy research. For economic analysis of policy issues, it provides a framework to help identify (1) those sets of data items which pertain to specific means/goals relationships for particular populations and which of those sets would be most germane to specific kinds of decisions, and (2) the kinds of inference structures that would be functional in addressing these relationships. For the analysis of bureaucratic and political arrangements, it helps clarify relationships between organizational or governmental structure and important institutional or social outcomes. Finally, the framework suggests the possibility of more complete analyses that simultaneously take into account both the objects and processes of choice; that is, the important relationships between particular sets of means and goals as well as the consequences of the processes by which choices are made concerning these relationships.

Such approaches to the analysis of public programs and policies are not required simply to satisfy the researcher's aesthetic concern with intellectual completeness. Rather, they are sorely needed to help overcome some of the critical policy failures of the past decade and a half. Several key sources of policy failure are beginning to be understood. In fields as diverse as housing, education, health care, manpower, and economic development, the formulation of policy has often focused on broad and abstractly formulated relationships between various means and goals. Insufficient attention, however, has been paid to what was required by either our political and bureaucratic institutions or the intended beneficiaries of the programs

in order to achieve desired public objectives. Further, many actions have been undertaken to enhance the performance of political and bureaucratic institutions through new mechanisms for citizen participation, central coordination, intergovernmental relations, and decentralization of responsibility. These adaptations in governmental structure have generally been developed without benefit of systematic conceptions of the possible consequences for important welfare outcomes. Therefore, an analytic framework that can take into account the objects of decisions as well as the processes of choice is required for the eminently practical purpose of improving our capacity to enhance human welfare through public action.

We recognize that these issues and problems are being addressed both in the field of indicator research and within the broader policy analysis community. We claim neither completeness nor exclusive validity for our particular approach. Rather we offer the major features of a broad gauged conceptual framework and suggest its potential usefulness for a variety of analytic purposes. Our current work attempts to further refine its conceptual features and tries to assess more fully its usefulness for a range of policy studies.[1] The framework is offered to others, either as a general theoretical approach that might be adapted to their concerns, or as an intellectual foil for the development of alternative approaches to the important and difficult intellectual problems of formulating and assessing public action.

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